Drive Like a Human: Rethinking Autonomous Driving with Large Language Models

Abstract

In this paper, we explore the potential of using a large language model (LLM) to understand the driving environment in a human-like manner and analyze its ability to reason, interpret, and memorize when facing complex scenarios. We argue that traditional optimization-based and modular autonomous driving (AD) systems face inherent performance limitations when dealing with long-tail corner cases. To address this problem, we propose that an ideal AD system should drive like a human, accumulating experience through continuous driving and using common sense to solve problems. To achieve this goal, we identify three key abilities necessary for an AD system: reasoning, interpretation, and memorization. We demonstrate the feasibility of employing an LLM in driving scenarios by building a closed-loop system to showcase its comprehension and environment-interaction abilities. Our extensive experiments show that the LLM exhibits the impressive ability to reason and solve long-tailed cases, providing valuable insights for the development of human-like autonomous driving. The related code are available at https:/ithub.om/PJLab-ADG/DriveLikeAHuman.